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EP 0458592 A2 EP 0431640 A2 EP 0367609 A2

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## (54) Radio antenna

(57) A radio frequency antenna (10) has electrically connected thereto, for example by means of a coaxial cable (14), a connector (16) having means for securing it to, in or adjacent the housing of a portable telephone (18) or other radio frequency transmitter and/or receiver. The connector incorporates an electrical coil, capacitor plates or other means adapted to couple without direct electrical contact, for example inductively or capacitatively, to an aerial mounted within or integral with the radio device. The antenna (10) may be mounted externally of a car, for example on the roof (12).

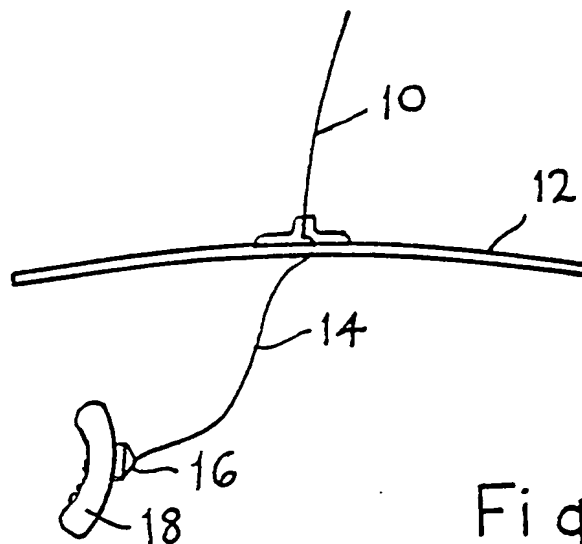


Fig.1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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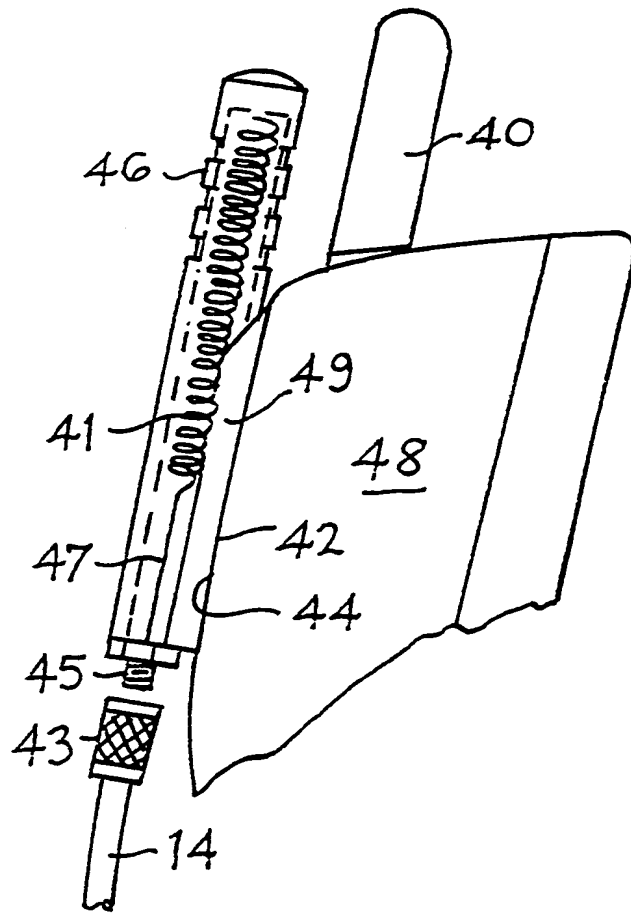


Fig. 4

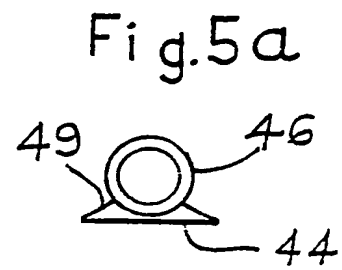


Fig. 5a

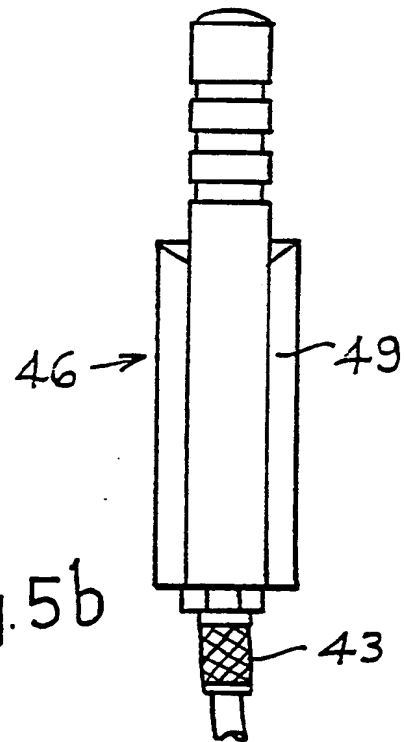


Fig. 5b

According to the present invention a radio frequency antenna has electrically connected thereto, for example by means of a coaxial cable, a connector having means for securing it to, in or adjacent the housing of a portable telephone or other radio frequency transmitter and/or receiver (hereinafter referred to for simplicity as a radio device), the connector having therein an electrical coil or capacitor plate or other means adapted to couple without direct electrical contact, for example inductively or capacitatively, to an aerial mounted within or integral with the said radio device.

The invention allows radio frequency signals picked up by an external antenna to be brought to a portable telephone or other radio device without the need for a direct electrical connection, so that the same antenna and connector can be used for any type of radio device.

The connector preferably has a flat surface to bear against the housing to which it is attached. This surface may for example be provided with a multiplicity of tiny plastic hooks to engage a patch of fibrous material secured to an outer surface of the housing, to effect an attachment of the type sold under the trade mark VELCRO. The fibrous patch can be permanently attached, for example by means of adhesive, to the outer surface of the housing of the radio device, in close proximity to the integral aerial, so that the connector can be releasably attached so as to bring signals from the outside antenna as close as possible to the integral aerial of the handset. Any other suitable method of attachment may be used, for example a clip or bracket.

Preferred embodiments of the invention will now be described with reference to the accompanying drawings wherein:

FIG. 1 shows schematically the connection between an external antenna mounted on the roof of a car and a

up by the aerial. Similarly, signals transmitted by the aerial 20 are picked up by the coil 31 by the same inductive coupling effect, and transmitted to the antenna 10 so as to transmit a much stronger signal than would be obtained by relying on the aerial 20 inside the car.

It will be appreciated that any suitable form of coil can be used, provided it is capable of coupling inductively with the aerial within the radio frequency band. Instead of a coil, the connector 16 may have a capacitor plate to interact capacitatively with the internal aerial.

Referring now to Fig. 4, 5a and 5b a connector 46 comprising a tubular plastics housing has a cylindrical chamber inside accommodating a coil 41 with a lead wire 47 to connect it to the core wire of coaxial cable 14. The cable is detachable from the connector 46, and can be connected thereto by means of an internally threaded terminal bushing 43 which screws on to a projecting screw threaded connector 45.

The connector 46 has on one side thereof a pad 49 with a flat surface 44 which again can form one side of a VELCRO type fastening, attaching to a mating surface 42 on the housing of a portable telephone 48.

In this embodiment the telephone has an aerial 40 which projects from one end thereof, and the connector 46 is therefore secured to the telephone in a position such that it projects beyond the telephone body alongside the aerial 40 so as to couple inductively therewith.

The use of the connection in accordance with the invention is not limited to portable telephones. It is applicable to all types of radio communication device, for example two-way radio systems.

Other means may be used to secure the connector to the telephone housing, provided the connection can be easily released. The VELCRO type fastening does however have the advantage that it can be used on housings of almost any

CLAIMS:

1. A radio frequency antenna assembly wherein an antenna has electrically connected thereto a connector spaced from the antenna, the connector having means for securing it to, in or adjacent a housing of a portable radio device as herein defined, and having therein means for coupling, without direct electrical contact, to an aerial mounted within or integral with said radio device.
2. An antenna assembly according to claim 1 wherein the connector has therein an electrical coil adapted to couple inductively with the aerial of the radio device.
3. An antenna assembly according to claim 1, wherein the connector incorporates a capacitor plate adapted to couple capacitatively with the aerial of the radio device.
4. An antenna assembly according to any preceding claim wherein the connector is electrically connected to the antenna by means of a coaxial cable.
5. An antenna assembly according to any preceding claim wherein a surface of the connector is secured to the outer surface of the housing by engagement of a multiplicity of plastic hooks of one said surface with a patch of fibrous material of the other.
6. A radio frequency antenna assembly substantially as herein described with reference to the accompanying drawings.

| Category | Identity of document and relevant passages | Relevant to claim(s) |
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